

Name _____

Bikini Bottom Genetics

Period _____

Scientists at Bikini Bottoms have been investigating the genetic makeup of the organisms in this community. Use the information provided and your knowledge of genetics to answer each question.

1. For each genotype below, indicate whether it is a heterozygous (He) OR homozygous (Ho).

TT _____ Bb _____ DD _____ Ff _____ tt _____ dd _____

Dd _____ ff _____ Tt _____ bb _____ BB _____ FF _____

Which of the genotypes in #1 would be considered purebred? _____

Which of the genotypes in #1 would be hybrids? _____

2. Determine the phenotype for each genotype using the information provided about SpongeBob.

Yellow body color is dominant to blue.

YY _____ Yy _____ yy _____

Square shape is dominant to round.

SS _____ Ss _____ ss _____



3. For each phenotype, give the genotypes that are possible for Patrick.



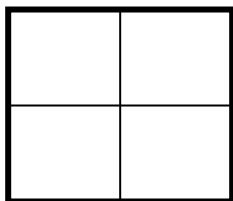
A tall head (T) is dominant to short (t).

Tall = _____ Short = _____

Pink body color (P) is dominant to yellow (p).

Pink body = _____ Yellow body = _____

4. SpongeBob SquarePants recently met SpongeSusie Roundpants at a dance. SpongeBob is heterozygous for his square shape, but SpongeSusie is round. Create a Punnett square to show the possibilities that would result if SpongeBob and SpongeSusie had children. HINT: Read question #2!

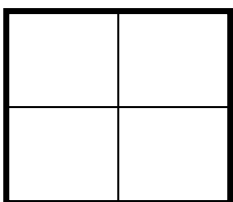


A. List the possible genotypes and phenotypes for their children.

B. What are the chances of a child with a square shape? ____ out of ____ or ____%

C. What are the chances of a child with a round shape? ____ out of ____ or ____%

5. Patrick met Patti at the dance. Both of them are heterozygous for their pink body color, which is dominant over a yellow body color. Create a Punnett square to show the possibilities that would result if Patrick and Patti had children. HINT: Read question #3!



A. List the possible genotypes and phenotypes for their children.

B. What are the chances of a child with a pink body? ____ out of ____ or ____%

C. What are the chances of a child with a yellow body? ____ out of ____ or ____%

6. Everyone in Squidward's family has light blue skin, which is the dominant trait for body color in his hometown of Squid Valley. His family brags that they are a "purebred" line. He recently married a nice girl who has light green skin, which is a recessive trait. Create a Punnett square to show the possibilities that would result if Squidward and his new bride had children. Use B to represent the dominant gene and b to represent the recessive gene.

A. List the possible genotypes and phenotypes for their children.

B. What are the chances of a child with light blue skin? ____%

C. What are the chances of a child with light green skin? ____%

D. Would Squidward's children still be considered purebreds? Explain!



7. Assume that one of Squidward's sons, who is heterozygous for the light blue body color, married a girl that was also heterozygous. Create a Punnett square to show the possibilities that would result if they had children.

A. List the possible genotypes and phenotypes for their children.

B. What are the chances of a child with light blue skin? ____%

C. What are the chances of a child with light green skin? ____%

8. Mr. Krabbs and his wife recently had a Lil' Krabby, but it has not been a happy occasion for them. Mrs. Krabbs has been upset since she first saw her new baby who had short eyeballs. She claims that the hospital goofed and mixed up her baby with someone else's baby. Mr. Krabbs is homozygous for his tall eyeballs, while his wife is heterozygous for her tall eyeballs. Some members of her family have short eyes, which is the recessive trait. Create a Punnett square using T for the dominant gene and t for the recessive one.

A. List the possible genotypes and phenotypes for their children.

B. Did the hospital make a mistake? Explain your answer.



Use your knowledge of genetics to complete this worksheet.

1. Use the information for SpongeBob's traits to write the phenotype (physical appearance) for each item.

Characteristic	Dominant Gene	Recessive Gene
Body Shape	Squarepants (S)	Roundpants (s)
Body Color	Yellow (Y)	Blue (y)
Eye Shape	Round (R)	Oval (r)
Nose Style	Long (L)	Stubby (l)

- (a) LL- _____ (e) Rr- _____
 (b) yy- _____ (f) ll- _____
 (c) Ss- _____ (g) ss- _____
 (d) RR - _____ (h) Yy - _____

2. Use the information in the chart in #1 to write the genotype (or genotypes) for each trait below.

- (a) Yellow body - _____ (e) Stubby nose - _____
 (b) Roundpants - _____ (f) Round eyes - _____
 (c) Oval eyes - _____ (g) Squarepants - _____
 (d) Long nose - _____ (h) Blue body - _____

3. Determine the genotypes for each using the information in the chart in #1.

- (a) Heterozygous round eyes - _____ (c) Homozygous long nose - _____
 (b) Purebred squarepants - _____ (d) Hybrid yellow body - _____

4. One of SpongeBob's cousins, SpongeBillyBob, recently met a cute squarepants gal, SpongeGerdy, at a local dance and fell in love. Use your knowledge of genetics to answer the questions below.

(a) If SpongeGerdy's father is a heterozygous squarepants and her mother is a roundpants, what is her genotype? Complete the Punnett square to show the possible genotypes that would result to help you determine Gerdy's genotype.

What is Gerdy's genotype? _____

(b) SpongeBillyBob is heterozygous for his squarepants shape. What is his genotype? _____

(c) Complete the Punnett square to show the possibilities that would result if Billy Bob & Gerdy had children.

(d) List the possible genotypes and phenotypes for the kids.

(e) What is the probability of kids with squarepants? _____ %

(f) What is the probability of kids with roundpants? _____ %

5. SpongeBob's aunt and uncle, SpongeWilma and SpongeWilbur, have the biggest round eyes in the family. Wilma is believed to be heterozygous for her round eye shape, while Wilbur's family brags that they are a pure line. Complete the Punnett square to show the possibilities that would result if SpongeWilma and SpongeWilbur had children.

(a) Give the genotype for each person. Wilma - _____ Wilbur - _____

(b) Complete the Punnett square to show the possibilities that would result if they had children.

(c) List the possible genotypes and phenotypes for the kids.

(d) What is the probability that the kids would have round eyes? ____ %

(e) What is the probability that the kids would be oval eyes? ____ %

6. SpongeBob's mother is so proud of her son and his new wife, SpongeSusie, as they are expecting a little sponge. She knows that they have a 50% chance of having a little roundpants, but is also hoping the new arrival will be blue (a recessive trait) like SpongeSusie and many members of her family. If SpongeBob is heterozygous for his yellow body color, what are the chances that the baby sponge will be blue? Create a Punnett square to help you answer this question.

7. SpongeBob's aunt is famous around town for her itty, bitty stubby nose! She recently met a cute squarepants fellow who also has a stubby nose, which is a recessive trait. Would it be possible for them to have a child with a regular long nose? Why or why not? Create a Punnett square to help you answer this question.

8. If SpongeBob's aunt described in #7 wanted children with long noses, what type of fellow would she need to marry in order to give her the best chances? Create a Punnett square to help you answer this question.

1. For each genotype below, indicate whether it is a heterozygous (He) OR homozygous (Ho).

TT _____ Pp _____ dd _____ Ff _____ Tt _____ FF _____

Which of the genotypes listed above would be considered purebred? _____

2. In Squidward's family, a blue body color (B) is dominant to green (b). Determine the phenotype for each genotype below based on this information.

BB _____ Bb _____ bb _____

3. If tall eyeballs (T) are dominant to short eyeballs(t), give the genotypes that are possible for members of Mr. Krabbs' family.

Tall eyeballs = _____ Short eyeballs = _____

4. SpongeBob is known for his big round eyes (R), which is dominant over an oval eye shape (r). If he is heterozygous for his round eye shape and marries a woman with oval eye shape, what type of eyes might the kids have?

- A. List the genotypes for each:

Heterozygous round eyes - _____ Oval eyes - _____

- B. Complete the Punnett square to show the possibilities that would result if SpongeBob had children with an oval-eyed woman.

- C. List the possible genotypes and phenotypes for their children.

- D. What are the chances of a child with a round eye shape? ____%

- E. What are the chances of a child with an oval eye shape? ____%

5. Patrick recently married Patti, a cute girl he met at a local dance. He is considered a purebred for his tall head shape (T), which is dominant over a short head (t). If Patti is a short-headed woman, what type of heads would their children have?

- A. List the genotypes for each: Patrick - _____ Patti - _____

- B. Complete the Punnett square to show the possible offspring.

- C. Which type of head is most likely: tall or short? Explain.

- D. Would the children be considered purebreds? Explain.

1. Use your notes to complete each definition.

Purebred - Also called _____ and consists of gene pairs with genes that are the _____.

Hybrid - Also called _____ and consists of gene pairs with genes that are _____.

Genotype is the actual _____ makeup represented by _____.

Phenotype is the _____ appearance of a trait, such as a _____ body color.

2. Classify each of the following gene pairs as heterozygous (He) or homozygous (Ho).

TT _____ Bb _____ dd _____ Ff _____ Rr _____

3. Give the possible genotypes for each trait based on the information provided in the chart.

Characteristic	Dominant Gene	Recessive Gene
Body Shape	Squarepants (S)	Roundpants (s)
Body Color	Yellow (Y)	Blue (y)
Eye Shape	Round (R)	Oval (r)

Purebred squarepants - _____ Blue body - _____

Hybrid round eyes - _____ Purebred roundpants - _____

Heterozygous squarepants - _____ Homozygous yellow body - _____



4. Give the phenotypes for each genotype based on the information provided in the chart.

SS - _____ Yy - _____ rr - _____

Rr - _____ ss - _____ YY - _____

5. Spongebob's cousin, SpongeJimBob, is a heterozygous yellow sponge. He recently married a blue sponge gal. Create a Punnett square to help you answer the questions.

What are the possible genotypes and phenotypes for the offspring?

What percentage would be yellow? _____ %

What percentage would be blue? _____ %

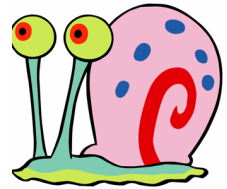
6. SpongeJimBob has oval eyes, while his bride is believed to be homozygous for her round eye shape. Create a Punnett square to help you answer the questions.

What are the possible genotypes and phenotypes for the offspring?

What percentage would have round eyes? _____ %

What percentage would have oval eyes? _____ %

Shelley, one of Gary's cousins, has a beautiful hot pink shell that is a result of incomplete dominance. The gene for a red shell is represented with an R, while W is used the gene for a white shell. A snail with both of those genes (RW) has a pink shell. Use this information to answer the questions.



7. If a snail with a red shell were crossed with one with a white shell, what color shell would the children have? Create a Punnett square to help you. Explain.

8. Sherry, who is a pink-shelled snail, would like to have kids with red shells. What type of snail would she need to marry in order for the best chance for kids with red shells? Explain your answer.

Bikini Bottom Genetics

Incomplete Dominance

SpongeBob loves growing flowers for his pal Sandy! Her favorite flowers, Poofkins, are found in red, blue, and purple. Use the information provided and your knowledge of incomplete dominance to complete each section below.

1. Write the correct genotype for each color if R represents a red gene and B represents a blue gene.

Red - _____ Blue - _____ Purple - _____

2. What would happen if SpongeBob crossed a Poofkin with red flowers with a Poofkin with blue flowers. Complete the Punnett square to determine the chances of each flower color.

- (a) Give the genotypes and phenotypes for the offspring.

(b) How many of the plants would have red flowers? _____%

(c) How many of the plants would have purple flowers? _____%

(d) How many of the plants would have blue flowers? _____%

3. What would happen if SpongeBob crossed two Poofkins with purple flowers? Complete the Punnett square to show the probability for each flower color.

- (a) Give the genotypes and phenotypes for the offspring.

(b) How many of the plants would have red flowers? _____%

(c) How many of the plants would have purple flowers? _____%

(d) How many of the plants would have blue flowers? _____%

4. What would happen if SpongeBob crossed a Poofkin with purple flowers with a Poofkin with blue flowers? Complete the Punnett square to show the probability for plants with each flower color.

- (a) Give the genotypes and phenotypes for the offspring.

(b) If SpongeBob planted 100 seeds from this cross, how many should he expect to have of each color?

Purple flowers - _____ Blue flowers - _____ Red flowers - _____

SpongeBob and his pal Patrick love to go jellyfishing at Jellyfish Fields! The fields are home to a special type of green jellyfish known as Goobers and only really great jellyfishermen are lucky enough to catch some on every trip. Many of the jellyfish are yellow (YY) or blue (BB), but some end up green as a result of incomplete dominance. Use this information to help you complete each section below.

5. What would happen if SpongeBob and Patrick crossed two “goobers” or green jellyfish? Complete the Punnett square to help you determine the probability for each color of jellyfish.

(a) Give the possible genotypes and phenotypes for the offspring.

(b) What percentage of the offspring would be yellow? _____%

(c) What percentage would be blue? _____%

(d) What percentage would be “goobers” (green)? _____%

6. What would happen if they crossed a yellow jellyfish with a goober? Complete the Punnett square to help you determine the probability for each color of jellyfish.

(a) Give the possible genotypes and phenotypes for the offspring.

(b) What percentage of the offspring would be yellow? _____%

(c) What percentage would be blue? _____%

(d) What percentage would be “goobers” (green)? _____%

7. What would happen if they crossed a blue jellyfish with a yellow jellyfish? Complete the Punnett square to help you answer the questions.

If 100 jellyfish were produced from this cross, how many would you expect for each?

Yellow - _____ Blue - _____ Goobers - _____

8. What would happen if they crossed a blue jellyfish with a goober? Complete the Punnett square to help you answer the questions.

If 100 jellyfish were produced from this cross, how many would you expect for each?

Yellow - _____ Blue - _____ Goobers - _____